

written his papers without having read Boole's "Laws of Thought." I knew that he was very anxious that the fact should be known, and I called attention to it. I could not state it as a fact known to me. His own assurance was the only ground I had, or could have, to go upon, and in assigning this it never occurred to me to doubt his statement, or to think that I was suggesting doubts to others.

As regards my half humorous suggestion that an attitude of slight social repression was desirable towards novelties of mere notation—not towards new conceptions or methods—I feel sure that almost every one who has not a private scheme of his own to protect will agree with me. Few things can be more perplexing to students of any subject than to find one author after another making use of a new notation to express old results (I mean no special reference to Mr. MacColl here, who does not seem to me one of the worst offenders in this way). At the time of writing my "Symbolic Logic" I had between twenty and thirty such schemes before me. Some of these, of course, express really distinct conceptions, or effect improvements in procedure, but most of them do not; we find half-a-dozen different signs standing for the same meaning, and half-a-dozen different meanings assigned to the same sign. I cannot but think that much of this confusion would be avoided if the various authors would take the trouble to inquire what had been already written upon their subject. The only "repres-ion" I should like to see introduced consists in the remonstrances of reviewers and students generally against the mere substitution of a new symbol for one which was already in use for expressing precisely the same process or conception. So far from wishing to discourage any attempts to improve on the results of Boole and others, I rejoice to see them, and think that Mr. MacColl himself has done some good work in this way. It would have been better still if he had not disfigured it by a notation which I think makes him regard his results as more original than they really are.

I need not seriously discuss those parts of Mr. MacColl's letter which give his opinion as to the impression which will be produced in other persons by a perusal of my book, and his "impression" that he has "somewhere seen Mr. Venn quoted as holding an opinion very much at variance with" a statement which he misquotes.¹ (By the way, I heartily agree with his "protest against that spirit of criticism which would offer two or three chipped bricks as a fair specimen of a house," &c., and think the chipping of the bricks a happy turn.) The rest of his letter contains criticisms upon my conclusions on a variety of rather intricate speculative questions. Having stated my own views as fully and accurately as I conveniently could only a few weeks ago, in a systematic work, I really must decline to be drawn into repeating them again, in a condensed form, in the columns of a scientific journal, even if the editor would consent to accept them.

J. VENN

Cambridge, June 12

Telephones in New Zealand, &c.

OBSERVING your paragraph on this subject in NATURE, vol. xiv. p. 88, it occurs to me that the following may be of interest:—When in Wellington and Dunedin, N.Z., at the end of December last, my opinion was asked by the Government Telegraphic officials there upon a pair of ordinary "Edison-Bell Telephones" (not Edison *bell-telephones*, as they are too frequently called) which they had just received from the United States for purposes of experiment. A careful trial under various conditions showed me that they were very good average instruments of ordinary delicacy, such as I had seen hundreds of previously in England and the States.

With these instruments, however, Dr. Lemon, the Superintendent of the Postal and Telegraph Service, was able to converse clearly between Wellington and Napier, over an ordinary land line 232 miles in length, while battery currents were passing over the wires on the same posts.

In New Zealand, Telegraphic communication is, and Telephonic communication will be, entirely in the hands of the Government. In Melbourne the telephone-exchange is worked by a private company, but the erection and maintenance of wires is carried out by the Victorian Government at the annual rate of 5/- per sub-

¹ What I spoke of was "those problems in Probability which Boole justly regarded as the crowning triumph of his system." What Mr. MacColl puts between inverted commas is that Boole "justly regarded his problems in Probability as the crowning triumph of his system," and challenges me to say whether or not I agree with Boole's solution of a certain well-known example. This considerably distorts the meaning of what I said.

scriber. In Sydney, I regret to say, nothing was being done in this matter. In Honolulu I found (last January) telephonic communication all over the town, but no telegraphs at all. The King of the Sandwich Islands however, Alii Kalakaua, who is shortly expected in England, told me that he greatly needed submarine cables between the various islands. On my return to England I had the pleasure of sending to Sydney materials for a private telephonic line on sugar plantations in the Fiji Islands, and my friend Mr. Frederick Cobb, manager of the Falkland Islands Company, tells me that the line he took out there at my suggestion is a great success.

At Wellington, where the central N.Z. telegraph office is, I was very much struck by the extreme ease with which duplex circuits were worked. Dr. Lemon informed me that it was scarcely necessary to alter the resistances once a week. He showed me a simple little carbon rheostat of his own invention which appeared to answer admirably; it consisted essentially of two pieces of carbon, the closeness of whose contact was regulated by a screw.

On my way home I paid a hurried visit to the central office of the Western Union Telegraph Company in New York (just at the critical time of the absorption by it of the other two companies and the consequent creation of a monopoly), and was greatly surprised to see the extent to which the 16,000 cells in the battery-room were being replaced by Siemens's dynamo-machines. I was told that one of them would "drive" about fifty wires, and was shown a number of plaster-of-paris cylinders, about five inches long and one inch diameter, which were put into circuit to diminish, when necessary, the intensity of the current. It may be remembered that as a rule American lines are less perfectly insulated than ours, and hence require stronger currents.

WM. LANT CARPENTER

6, York Buildings, Weymouth, June 1

Implements at Acton

MR. PERCEVAL'S letter in NATURE, vol. xxiv. p. 101, is an interesting one, but the occurrence of Neolithic implements at and near Acton has been known (if not published) for many years past. In the Pitt-Rivers' collection may be seen Neolithic scrapers and flakes from the Acton district. I have found Neolithic stones in the neighbourhood of Acton and Willesden for many years past; and only a few weeks ago I picked up a beautiful and perfect knife of black flint made from a large flake, five and a half inches long, and one and three quarter inches wide, in the field on the east of Acton Station of the North London Railway. Many of the Neolithic flints from this position are white. A considerable number of Neolithic implements and flakes have at different times been dredged up from the Thames to the West of London, and some of these have been quite recently exhibited. I do not attach importance to the quartzite pebble, as pebbles of quartzite are extremely common in the glacial deposits at the North of London, and very common in the gravels of the Thames and its northern tributaries. They also occur *in situ* at the north of Willesden.

Will Mr. Perceval kindly furnish the heights at the Hammersmith position, and say whether he is positive that the gravel he has in view was dug on the spot, and whether the implements occur there (as his letter implies) in "remarkable abundance"? I have repeatedly examined the low gravels about Hammersmith, Fulham, and Chelsea, but with no result. For more than three years I have never missed an opportunity of looking over the low gravels belonging to these places, together with the positions at West Brompton and Kensington, where thousands of tons of gravel have been excavated. My result has been one dubious flake, probably washed down from one of the higher terraces. I however have heard of two Paleolithic implements having been found—one at Kensington and the other at West Brompton—but whether from the local gravel or not I am uncertain.

I by no means wish to imply that because I have been unable to find implements in the lower gravels therefore some one else may not have found them. Some one may have been always before me and picked them up, or I may have constantly looked over unproductive patches.

The places mentioned by Mr. Perceval are, it must be remembered, frequently ballasted with gravel brought from a distance by the Thames, by the Grand Junction Canal, and by the Great Western Railway. I know of at least five different localities whence the Acton and Hammersmith gravel is brought, one

locality being in Kent. It is therefore of the highest importance that one should know for certain whence the gravel has been derived that one sees on the roads.

I live in an implementiferous district, and find Palæolithic implements in the Highbury and Clapton gravels; but a visitor would make a fatal mistake if he supposed that all the gravel on the roads about here belongs to the district. Sometimes many tons of gravel are brought here from Walthamstow; at other times from Ware or Hertford; sometimes from Dartford, and from other places. Unless, therefore, the greatest possible care is taken in ascertaining the exact locality whence the ballast comes, mistakes are certain to occur.

The lowest gravels about here are unproductive of the works of primeval man, with the exception of, at times, a stray flake or two, probably derived from a higher level. The evidence that I have seen in the lower gravels round London points to the correctness of the conjecture made by General Pitt-Rivers, that the Palæolithic age had passed away before the lower parts of the Thames Valley were excavated.

WORTHINGTON G. SMITH
125, Grosvenor Road, Highbury, N.

How to Prevent Drowning

I HAVE read with some interest Dr. MacCormac's letters on the subject of water-treading as means of preventing drowning.

I am sorry that I cannot agree with him, as it would be decidedly a matter of congratulation if some practical means of diminishing the number of casualties from drowning were found. Personal experience, however, prevents my agreeing with Dr. MacCormac.

I am a tolerably good swimmer, can swim in all the different fashions, but I can neither float nor tread water.

Shortly after Dr. MacCormac's first letter appeared I went to swimming baths with a view of putting the matter to the test. I had carefully read Dr. MacCormac's letter, and determined to give it a fair trial. I minutely observed all his directions, and invariably sank every time I tried his plan.

Now it must be remembered that I am a swimmer, and so far as swimming goes, perfectly at home in the water. Moreover, I was not in the least flustered. When I sank I made no attempt to rise again by swimming; I remained in what Dr. MacCormac would call the orthodox position for treading water, only opening my eyes in order to see whether I was ascending or descending. As however I found that I continued to do the latter until I reached the bottom of the bath, and there seemed to be no probability that I should rise without some further effort, I was at last compelled to make this effort.

This was the course of affairs every time I made the attempt. Moreover, whenever I essayed to float on the surface, although I carefully assumed the correct position, threw my head well back, and took the deep inspiration, the result was the same.

Arguing from these facts, it seems to me pretty clear that it is not everybody who can tread water or float. Why this is so, appears to me to lie in the fact that the human body is not always lighter, bulk for bulk, than water. Perhaps with plump children and others with plenty of adipose tissue about their frame this may be the case, but with spare people who consist mainly of muscle and bone, the specific gravity must be greater than that of water. The body of a fish when the animal is dead will sink until decomposition sets in and causes it to float.

For these reasons I fear that Dr. MacCormac's suggestion will not be found of so much practical use as he hopes. The apparent ease of the process described by Dr. MacCormac may in itself be the cause of rash proceedings by those who cannot swim, and may so lead to greater loss of life, the very evil which the suggestion is intended to diminish.

W. HENRY KESTEVEN

401, Holloway Road, N., June 7

ON the Continent the facilities are greater than in England, where factories and steam-boats spoil the pleasure of swimming, and everybody is well aware that *all can float upon fresh water without assistance from their hands and feet*. It is what in the Paris swimming-schools is called "faire le mort."

Anybody—stout, lean, cripple, halt—is able to do so, and I taught, myself, a poor little hunchback how to perform this easy feat; but his deformity placing him in a state of unstable equilibrium, he was obliged to keep his arms stretched at an angle from 45° to 60°.

Some minutes are sufficient in fresh water to make a proficient and a live "mort." The way to do it is very simple, and Mr. MacCormac described it very exactly, with the omission of some particulars relating to the way of breathing, which had no direct reference to his chief and beneficial topic, "treading water."

He who wishes to "faire le mort" must first draw a deep breath, and keep it, then put himself on his back, with his head thrown backwards, as recommended by Mr. MacCormac, and allow his limbs to droop slackly without any stiffness, no matter in what position.

The body will sink at first under water, but it will immediately rise nearly on a level with the surface, the only parts quite free from water being the chest and the nose and mouth, around which the water describes an oval, whilst the eyes are at times over, at times under, water.

The "mort" can remain floating in this way as long as his breath allows, though it is better not to wait longer than two or three seconds, to avoid fatigue; then he must quickly emit it, draw another deep breath, and keep it again.

The body sinks as before, rises immediately, regaining its floating position, nose, mouth, and chest emerging again from water.

This can be continued for hours together without the least motion of legs or arms, as your readers will be able to verify for themselves, either at the Pont Royal or Ligny swimming schools, on their visit to the Paris Exhibition of Electricity.

CHATEL

Jersey, June 5

P.S.—I ought to add that whilst floating on fresh water the body is not quite on a level with the surface, but from the chest, that is out of water, to the toes, which are about six or eight inches under water, figures an inclined plane, the slope of which varies with everybody, and that any attempt to bring the toes on a level with the surface makes the body sink. On the contrary, the deeper the head is sunk backwards under water the more the body emerges.

Auroric Light

JUNE 6, faint lights, especially to the northward, between 10 and 12; smart frost.

June 7, at 10, masses of purplish light rising from the north-east and congregating about the zenith; pencils of greenish yellow and white rising to the north; these continued up to 12, after which no observations were made; very smart frost, which bit the potato-stalks.

June 7, from 10 to 12, well-marked and at times brilliant columns, pencils, and masses of red rising all round the heavens at intervals, and congregating at the zenith; a most severe white frost that burnt up all the potatoes on the valley flats and on the uplands. At 5.30 on the 8th the frost was so thick that the ground had the appearance as if it had snowed during the night.

Ovoca, Ireland, June 10

G. H. KINAHAN

A Singular Cause of Shipwreck

IN NATURE, vol. xxiv. p. 106, you mention a "singular case of shipwreck" caused by waves and spray freezing on a steamer and sinking it by its weight. Cases of this kind caused by frozen spray alone are known near the east coast of the Black Sea. North of 44°, where the mountains are not very high, an exceedingly strong and sudden north-east wind is frequent, quite similar to the Dalmatian Bora, and called alike. It descends at a certain angle to the sea, raising a great quantity of spray. In winter this spray immediately freezes, and ships may sink by its weight. On January 25, 1848, a war-ship, anchored in the middle of the Bay of Noerrossiisk, sank in this manner. As the weather was fine before, a great part of the crew were ashore, and the storm arrived with such suddenness that the ship sank from the weight of the frozen spray. On account of the bora this coast is avoided by merchant-ships in winter, and visited only by a line of steamers subventioned by the Government.

St. Petersburg, June 8

A. WOEIKOF

OBSERVATIONS ON THE HABITS OF ANTS

ON Thursday (June 2) Sir John Lubbock read a further paper on this subject at the meeting of the Linnean Society. He said that in one of his former papers